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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/616,842	07/10/2003	Lipeng Cao	SC12795TS	1718

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FREESCALE SEMICONDUCTOR, INC.  
LAW DEPARTMENT  
7700 WEST PARMER LANE MD:TX32/PL02  
AUSTIN, TX 78729

EXAMINER
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OCHOA, JUAN CARLOS

ART UNIT	PAPER NUMBER
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2123

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
3 MONTHS	01/16/2007	PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

**Office Action Summary**

Application No.

10/616,842

Applicant(s)

CAO, LIPENG

Examiner

Juan C. Ochoa

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 10 July 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-33 is/are pending in the application.
- 4a) Of the above claim(s) 16-30 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-15 is/are rejected.
- 7) ☒ Claim(s) 31-33 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 10 July 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)  | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)   | 5) <input type="checkbox"/> Notice of Informal Patent Application                       |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)<br>Paper No(s)/Mail Date <u>7/10/03</u> . | 6) <input type="checkbox"/> Other: _____  |

### **DETAILED ACTION**

1. Claims 1–33 are pending in this application, claims 1–15 and 31–33 have been elected without traverse, claims 16–30 have been withdrawn as being directed to the non-elected invention.

### ***Election/Restrictions***

2. Restriction to one of the following inventions is required under 35 U.S.C. 121:

- I. Claims 1–15 and 31–33, drawn to method of deriving a power transfer function of a circuit, classified in class 703, subclass 18.
- II. Claims 16–30, drawn to an apparatus comprising circuits, classified in class 375, subclass 224.

3. The inventions are distinct, each from the other because of the following reasons:

4. Inventions I and II are related as process and apparatus for its practice. The inventions are distinct if it can be shown that either: (1) the process as claimed can be practiced by another and materially different apparatus or by hand, or (2) the apparatus as claimed can be used to practice another and materially different process. (MPEP § 806.05(e)). In this case a device other than the apparatus can derive a power transfer function. Also the apparatus claimed could provide power monitoring for a variety of applications.

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5. Because these inventions are independent or distinct for the reasons given above and have acquired a separate status in the art in view of their different classification, restriction for examination purposes as indicated is proper.

6. Because these inventions are independent or distinct for the reasons given above and the inventions require a different field of search (see MPEP § 808.02), restriction for examination purposes as indicated is proper.

7. During a telephone conversation with David G. Dolezal on 12/4/06 a provisional election was made without traverse to prosecute the invention of Invention I, claims 1–15 and 31–33. Affirmation of this election must be made by applicant in replying to this Office action. Claims 16–30 are withdrawn from further consideration by the examiner, 37 CFR 1.142(b), as being drawn to a non-elected invention.

### ***Specification***

8. The disclosure is objected to because page 5, lines 9 and 10 contain application cross–references in need of updated information. Applicant is required to update such information.

9. The disclosure is objected to because of the following informalities:

10. Page 2, line 2, includes the misspelled term “coherences”, should be “coherencies”.

11. Page 7, line 16, includes the misspelled term “coherences”, should be “coherencies”.

12. Appropriate correction is required.

***Claim Objections***

13. Claims 31–33 are objected to because of the following informalities:
14. Claim 31 lines 5–6 include “wherein each power impulse response of the at least one power impulse response representative of at least one input of the plurality of inputs”, meaning is unclear. Examiner interprets as “wherein each power impulse response of the at least one power impulse response is representative of at least one input of the plurality of inputs” for examination purposes.

***Claim Rejections - 35 USC § 112***

15. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

16. Claim 5 is rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the enablement requirement. The claim(s) contains subject matter, which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention. Examiner does not see the subject matter description of “clustering in multi-dimensional space having a dimension for each test” in the specification.

17. The following is a quotation of the second paragraph of 35 U.S.C. 112:

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The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

18. Claims 7–9 are rejected under 35 U.S.C. 112, second paragraph, as being incomplete for omitting essential elements, such omission amounting to a gap between the elements. See MPEP § 2172.01.

19. As to claim 7, The omitted elements are: a connection between claim 1's "grouping the plurality of inputs into groups of at least one input" and "transfer function includes a portion for each group of the groups" and claim 7's "a method wherein each portion implements a model". As per claim 1, groups are composed of a plurality of inputs and a transfer function includes a portion for each group. Claim 7 calls for each portion implementing a model. Examiner confused as how to interpret "a model for a group of signals" in relation to the rest of the claimed invention for examination purposes.

20. Dependent claims inherit the defect of the claim from which they depend.

### ***Claim Rejections - 35 USC § 103***

21. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

22. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

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1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

23. Claims 1–3, 12, 14, and 15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Uchino, (Uchino hereinafter), U.S. Patent 7,076,405, taken in view of Macii et al., (Macii hereinafter), Stream Synthesis For Efficient Power Simulation Based On Spectral Transforms.

24. As to claim 1, Uchino discloses a method of deriving a power transfer function (see col. 3, lines 38–41) of a circuit, the method comprising: grouping the plurality of inputs into groups of at least one input (see col. 10, lines 44–50); and providing an estimate of power consumption of the circuit responsive to signals applied to the plurality of inputs of the circuit, wherein the transfer function includes a portion for each group of the groups (see col. 3, line 65 to col. 4, line 17).

25. While Uchino discloses grouping the plurality of inputs into groups of at least one input and providing an estimate of power consumption of the circuit responsive to signals applied to the plurality of inputs of the circuit, wherein the transfer function includes a portion for each group of the groups; Uchino fails to disclose running at least one test on a circuit having a plurality of inputs to obtain information on power consumption of the circuit responsive to signals applied to the plurality of inputs, grouping the plurality of inputs into groups of at least one input based on a commonality of power consumption of the circuit for the plurality of inputs as determined from the information and deriving a power transfer function.

26. Macii discloses running at least one test on a circuit having a plurality of inputs to obtain information on power consumption of the circuit responsive to signals applied to the plurality of inputs (see page 417, col. 2, next to last paragraph, lines 3–6); grouping the plurality of inputs into groups of at least one input based on a commonality of power consumption of the circuit for the plurality of inputs as determined from the information (see page 417, col. 2, next to last paragraph, lines 1–3 and 7–10); deriving a power transfer function (see "power transfer function" as "input switching function" in page 419, col. 1, 3<sup>rd</sup> paragraph, lines 3–6).

27. Uchino and Macii are analogous art because they are both related to estimating power consumption.

28. Therefore, it would have been obvious to one of ordinary skill in this art at the time of invention by applicant to utilize the steps of Macii in the method of Uchino because Macii minimizes the time required to perform simulation-based power estimation by reducing the length of the input trace to be fed to the simulator (see page 417, col. 1, lines 1–3), and as a result, Macii reports the following improvements over his prior art: synthesizing short streams of patterns that can be used for power simulation instead of the long input traces usually determined by the designers through architectural, behavioral, or system-level simulation. His method uses spectral information (in addition to the usual correlation measures) collected on the given sequence to properly form a reduced stream which guarantees a large speed-up in the simulation time at the price of a very low average power estimation error, and thus



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generates reduced streams for a large variety of original input traces (see page 426, col. 1, Conclusion).

29. As to claim 2, Macii discloses a method wherein the grouping comprises: deriving at least one coherency for each input of the plurality with respect to power consumption based on the information (see page 420, col. 2, paragraphs 2 and 3) and clustering the coherencies to identify the groups (see page 420, col. 2, last paragraph, lines 1–7).

30. As to claim 3, deriving at least one coherency further includes: deriving, for each input of the plurality and for each test of the at least one test an average squared coherency (manipulation of mathematical concepts) wherein the clustering the coherencies further includes clustering the average squared coherencies (manipulation of mathematical concepts).

31. As to claim 12, Macii discloses a method further comprising: simulating the circuit (see page 422, col. 1, next to last paragraph, lines 3–5); wherein the running at least one test on the circuit includes running the at least one test on the simulated circuit (see page 422, col. 2, 2<sup>nd</sup> paragraph).

32. As to claim 14, Macii discloses a method wherein the deriving includes performing frequency domain analysis of the information (see page 417, col. 1, 2<sup>nd</sup> paragraph).

33. As to claim 15, Macii discloses a method wherein the grouping includes performing frequency domain analysis of the information (see page 417, col. 1, 2<sup>nd</sup> paragraph).

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34. Claim 4 is rejected under 35 U.S.C. 103(a) as being unpatentable over Uchino taken in view of Macii as applied to claim 2 above, and further in view of Welch, (Welch hereinafter), The Use Of Fast Fourier Transform For The Estimation Of Power Spectra: A Method Based On Time Averaging Over Short, Modified Periodograms.

35. As to claim 4, Macii discloses a method wherein the deriving at least one coherency further includes: taking a Fourier transform applied of each signal applied to each input of the plurality for each test of the at least one test (see page 419, col. 1, last paragraph, lines 9–13). A coherency of the at least one coherency for each test is derived from the Fourier transform of the signal applied to the input for that test and the Fourier transform of the power consumed for that test (manipulation of mathematical concepts).

36. While the Uchino–Macii method takes a Fourier transform applied of each signal applied to each input of the plurality for each test of the at least one test; the Uchino–Macii method lacks deriving at least one coherency further including: taking a Fourier transform applied of each signal applied to each input of the plurality for each test of the at least one test.

37. Welch discloses taking a Fourier transform of the power consumed for each test of the at least one test (see page 70, col. 2, lines 8–9).

38. Uchino, Macii, and Welch are analogous art because they are related to estimating power consumption.

39. Therefore, it would have been obvious to one of ordinary skill in this art at the time of invention by applicant to utilize the steps of Welch in the Uchino–Macii method

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because Welch outlines a method for the application of the fast Fourier transform algorithm to the estimation of power spectra, which involves sectioning the record, taking modified periodograms of these sections, and averaging these modified periodograms (see page 70, col. 1, Introduction, lines 1–6), and as a result, Welch reports the following improvements over his prior art: fewer computations than other methods, transformation of sequences which are shorter than the whole record, and a potential resolution in the time dimension (see page 70, col. 1, Introduction, lines 6–12).

40. Claim 10 is rejected under 35 U.S.C. 103(a) as being unpatentable over Uchino taken in view of Macii as applied to claim 1 above, and further in view of Joseph et al., (Joseph hereinafter), Run-Time Power Estimation in High Performance Microprocessors (See IDS dated 7/10/03).

41. As to claim 10, While the Uchino–Macii method derives a power transfer function of a circuit; the Uchino–Macii method lacks implementing the power transfer function in a second circuit wherein the second circuit includes inputs coupled to the inputs of the circuit.

42. Joseph discloses a method further comprising: implementing the power transfer function in a second circuit wherein the second circuit includes inputs coupled to the inputs of the circuit (see “run-time monitor” in page 135, col. 2, last paragraph, lines 1–3).

43. Uchino, Macii, and Joseph are analogous art because they are related to estimating power consumption.

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44. Therefore, it would have been obvious to one of ordinary skill in this art at the time of invention by applicant to utilize the steps of Joseph in the Uchino–Macii method because Joseph examines the use of hardware performance counters as proxies for power meters, discusses which performance counters count power-relevant events, estimates event counts for power-relevant events not well supported by his prior art (see page 135, col. 1, 2<sup>nd</sup> paragraph, lines 4–9), and as a result, Joseph reports the following improvements over his prior art: instead of relying on simplified performance simulations, programmers can evaluate the impact of their final optimizations on real hardware (see page 136, col. 1, , lines 8–12) and applications in high performance processors which exhibit complex energy usage patterns providing component power consumption (see page 140, col. 1, , 2<sup>nd</sup> paragraph, lines 4–5).

***Allowable Subject Matter***

45. Claims 5 and 7–9 would be allowable if rewritten to overcome the rejection(s) under 35 U.S.C. 112, 2nd paragraph, set forth in this Office action and to include all of the limitations of the base claim and any intervening claims.

46. Any indication of allowability of the claims not rejected on prior art is being held in abeyance pending the manner in which applicant amends or responds to the above rejections.

47. Claims 6, 11, and 13 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

48. Claims 31–33 are objected to for informalities but would be allowable if rewritten correcting the deficiencies.

49. The following is a statement of reasons for the indication of allowable subject matter:

50. While Uchino discloses a method of deriving a power transfer function (see col. 3, lines 38–41) of a circuit,

Macii minimizes the time required to perform simulation-based power estimation by reducing the length of the input trace to be fed to the simulator (see page 417, col. 1, lines 1–3),

Welch outlines a method for the application of the fast Fourier transform algorithm to the estimation of power spectra, which involves sectioning the record, taking modified periodograms of these sections, and averaging these modified periodograms (see page 70, col. 1, Introduction, lines 1–6),

and Joseph discloses deducing the actual runtime power dissipated by different processor units on a CPU chip (see page 135, col. 1, 2<sup>nd</sup> paragraph, lines 1–4),

none of these references taken either alone or in combination disclose the following limitations specifically including:

claim 6 "determining an accuracy of the transfer function and changing the coefficients to improve the accuracy of the power transfer function",

claims 11 and 13 "deriving a second power transfer function for providing an estimate of power consumption of the second circuit responsive to signals applied to the plurality of

inputs of the second circuit, wherein the second power transfer function includes a portion for each group of the groups of the second circuit",  
and claim 31 "deriving at least one power impulse function from the information",  
in combination with the remaining elements and features of the claimed invention. Also,  
there is no motivation to combine none of the references to meet these limitations. It is  
for these reasons that applicant's invention defines over the prior art of record.

51. As allowable subject matter has been indicated, applicant's reply must either comply with all formal requirements or specifically traverse each requirement not complied with. See 37 CFR 1.111(b) and MPEP § 707.07(a).

### ***Conclusion***

52. Examiner would like to point out that any reference to specific figures, columns and lines should not be considered limiting in any way, the entire reference is considered to provide disclosure relating to the claimed invention.

53. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Juan C. Ochoa whose telephone number is (571) 272-2625. The examiner can normally be reached on 7:30AM - 4:00 PM.

54. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Paul Rodriguez can be reached on (571) 272-3753. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

55. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR.

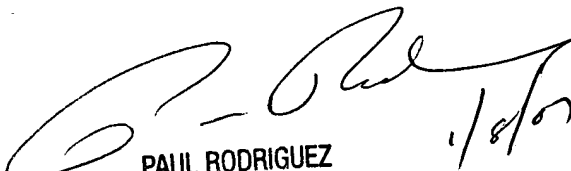
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PAUL RODRIGUEZ  
SUPERVISORY PATENT EXAMINER  
TECHNOLOGY CENTER 2100